United States Patent [19]

Beery

[11] **4,133,262**

[45] **Jan. 9, 1979**

[54] **INKING APPARATUS**

[75] Inventor: **Jack Beery**, Farmington, Mich.

[73] Assignee: **Burroughs Corporation**, Detroit, Mich.

[21] Appl. No.: **824,527**

[22] Filed: **Aug. 15, 1977**

Related U.S. Application Data

[62] Division of Ser. No. 650,707, Jan. 20, 1976, Pat. No. 4,069,755.

[51] **Int. Cl.**[2] **B41F 31/00**

[52] **U.S. Cl.** **101/350**; 101/91; 101/101; 101/235

[58] **Field of Search** 101/91, 97, 98, 101, 101/108, 348–358, 235

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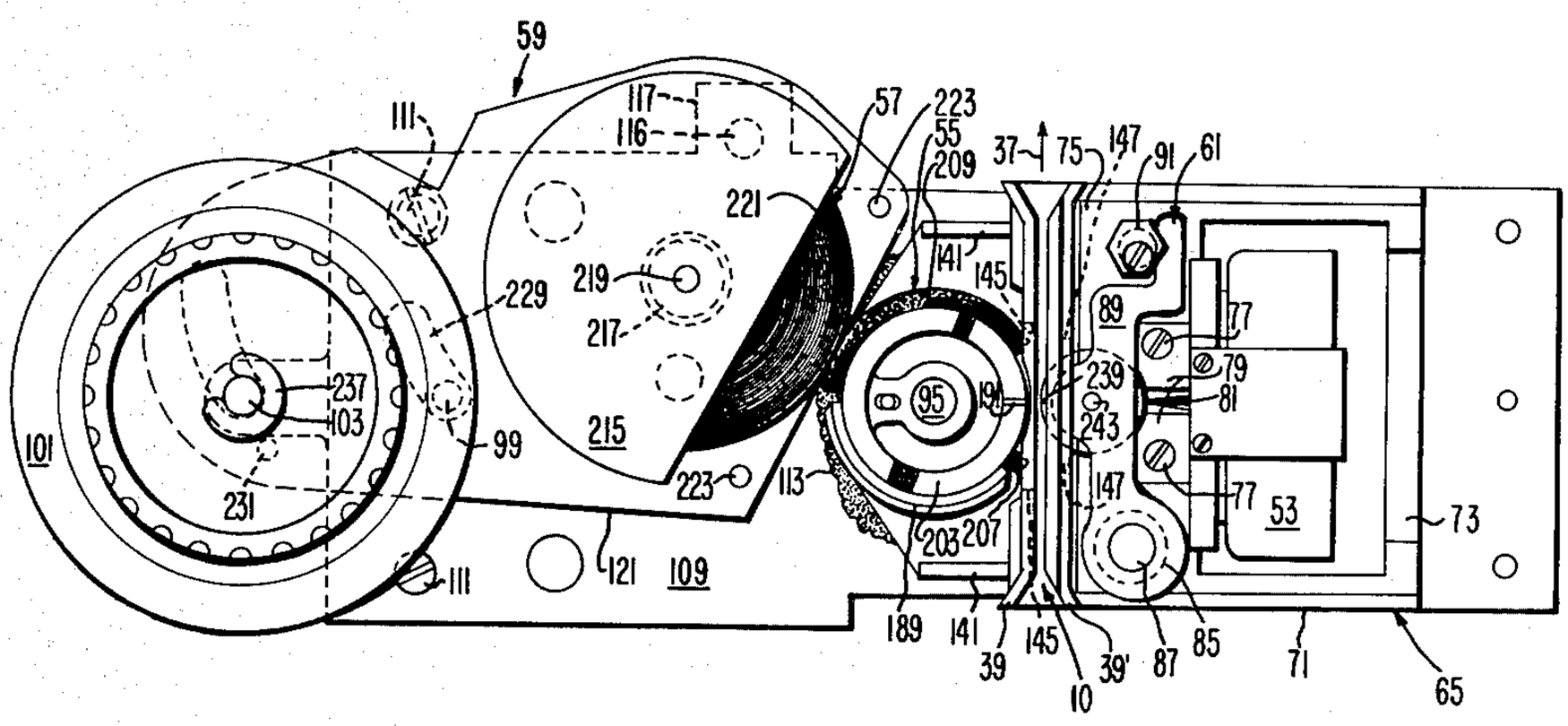
Primary Examiner—Edward M. Coven

Attorney, Agent, or Firm—Charles P. Sammut; David R. Syrowik; Carl Fissell, Jr.

[57] **ABSTRACT**

An endorser for use in document processing apparatus is provided with a matrix wire printer for printing variable information on documents as they are transported at a controlled speed along a transport path forming part of an endorsing station, and with a rotatable ink stamp driven by a controlled speed motor for printing fixed information on the documents in predetermined relationship with the variable information. A rotatably mounted endorser head assembly comprised of a velocity control member and an interrupted curvilinear platen, in addition to the ink stamp, is drivably rotated by the controlled speed motor to initially intercept and decelerate a document entering the endorsing station, and to thereafter print the fixed and variable information on the document. Deceleration of the document is accomplished by the velocity control member of the endorser head assembly in cooperation with a first biased back-up roller. The printing of the fixed information is accomplished by the ink stamp of the endorser head assembly in cooperation with a second biased back-up roller, and the printing of the variable information is accomplished by the matrix wire printer in cooperation with thea curvilinear platen of the endorser head assembly. The ink stamp and curvilinear platen are continuously inked by a rotatable ink transfer member that is adjustably maintained in frictional contact with the ink stamp and the platen.

4 Claims, 13 Drawing Figures



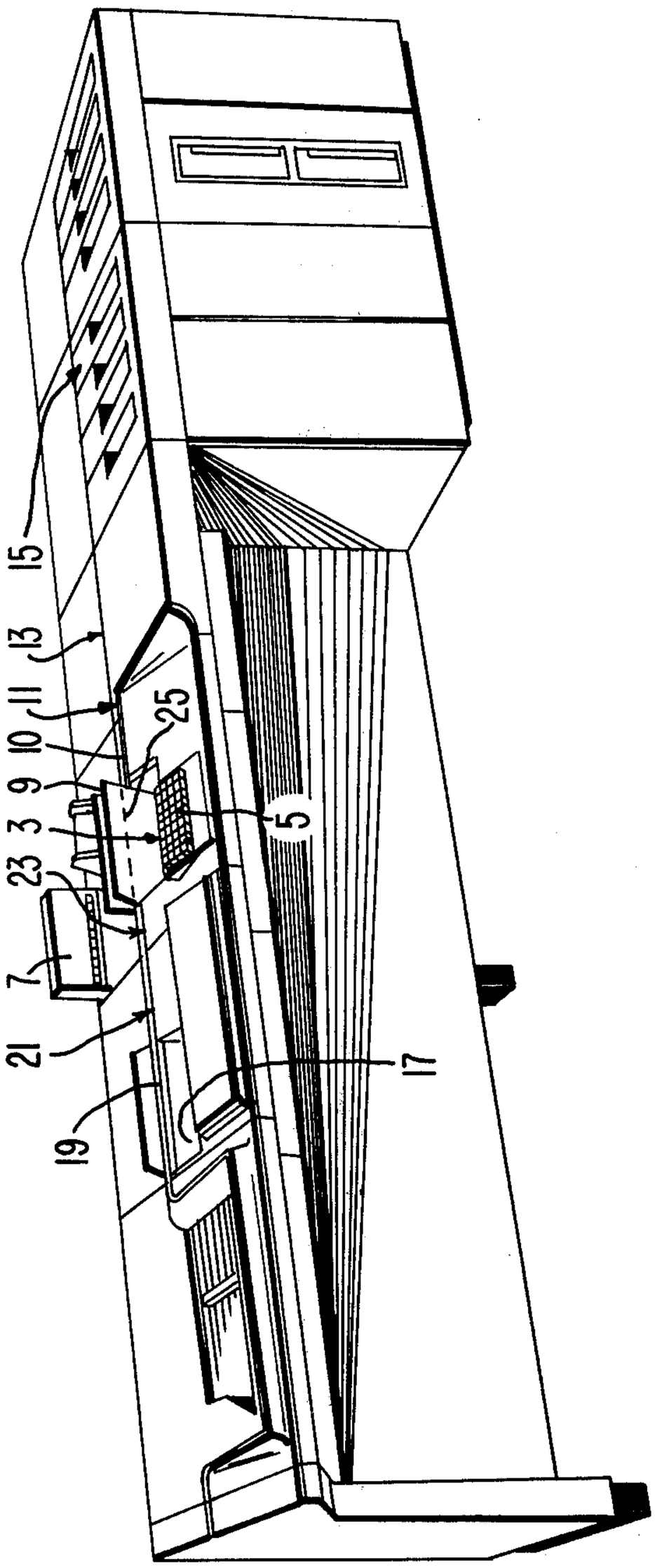


FIG. 1.

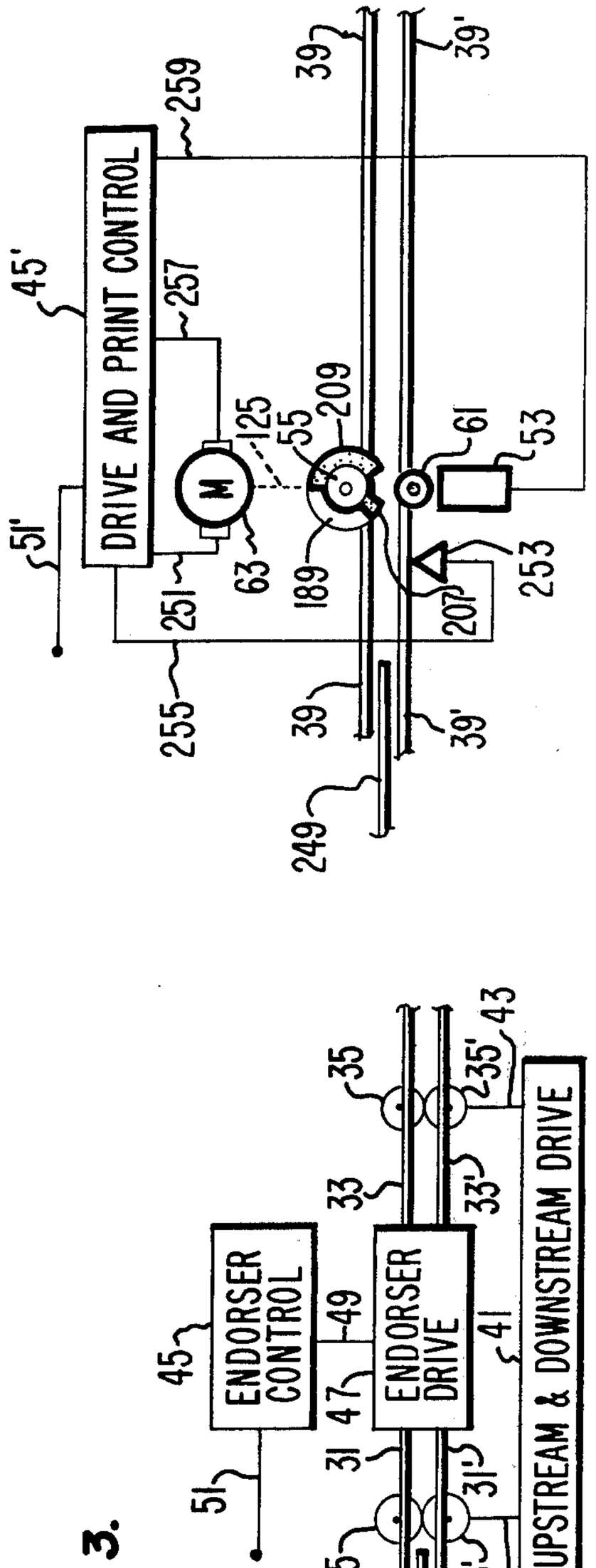
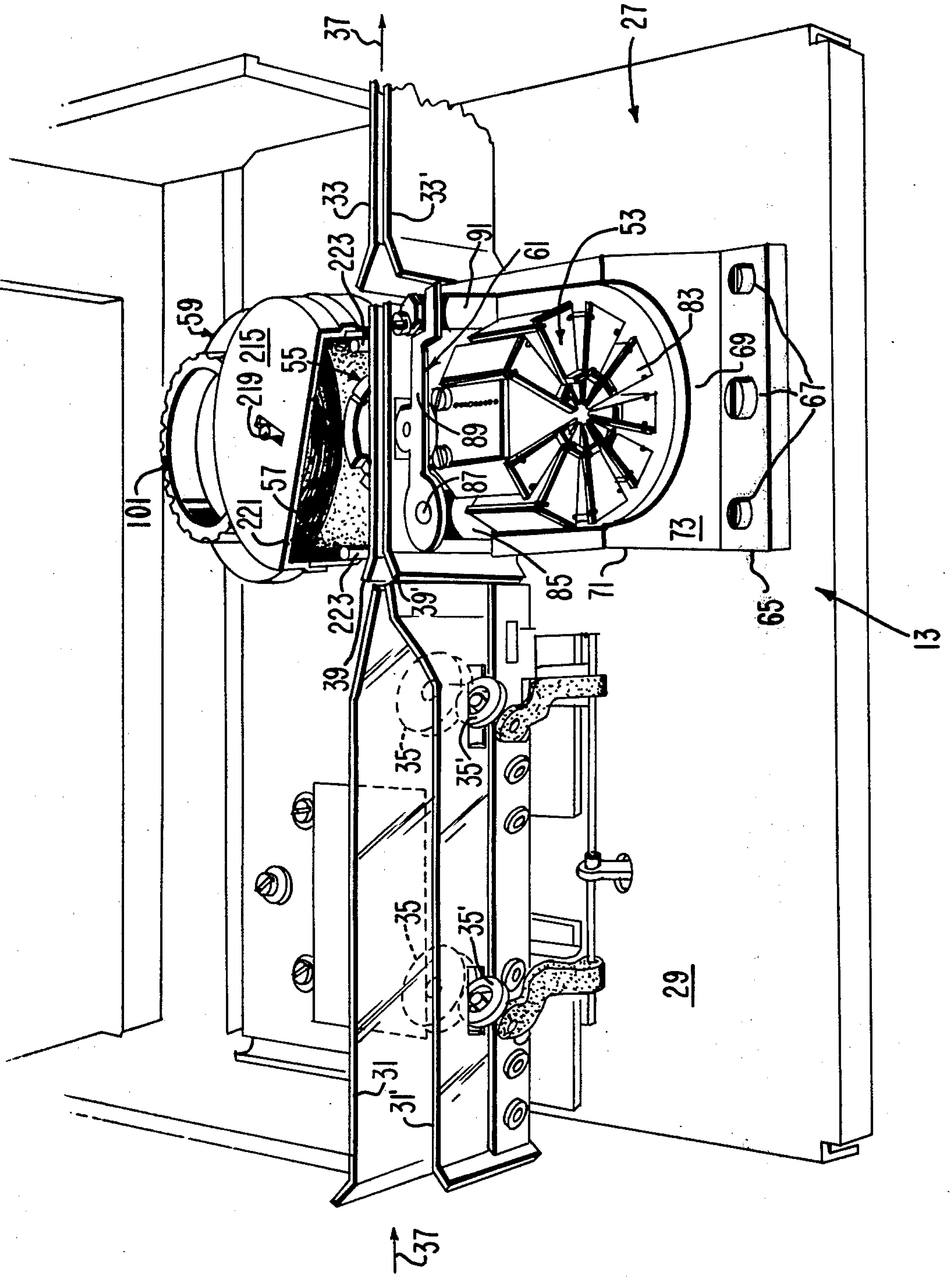


FIG. 4.

FIG. 3.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27
33
33'
223
91
61
53
59
215
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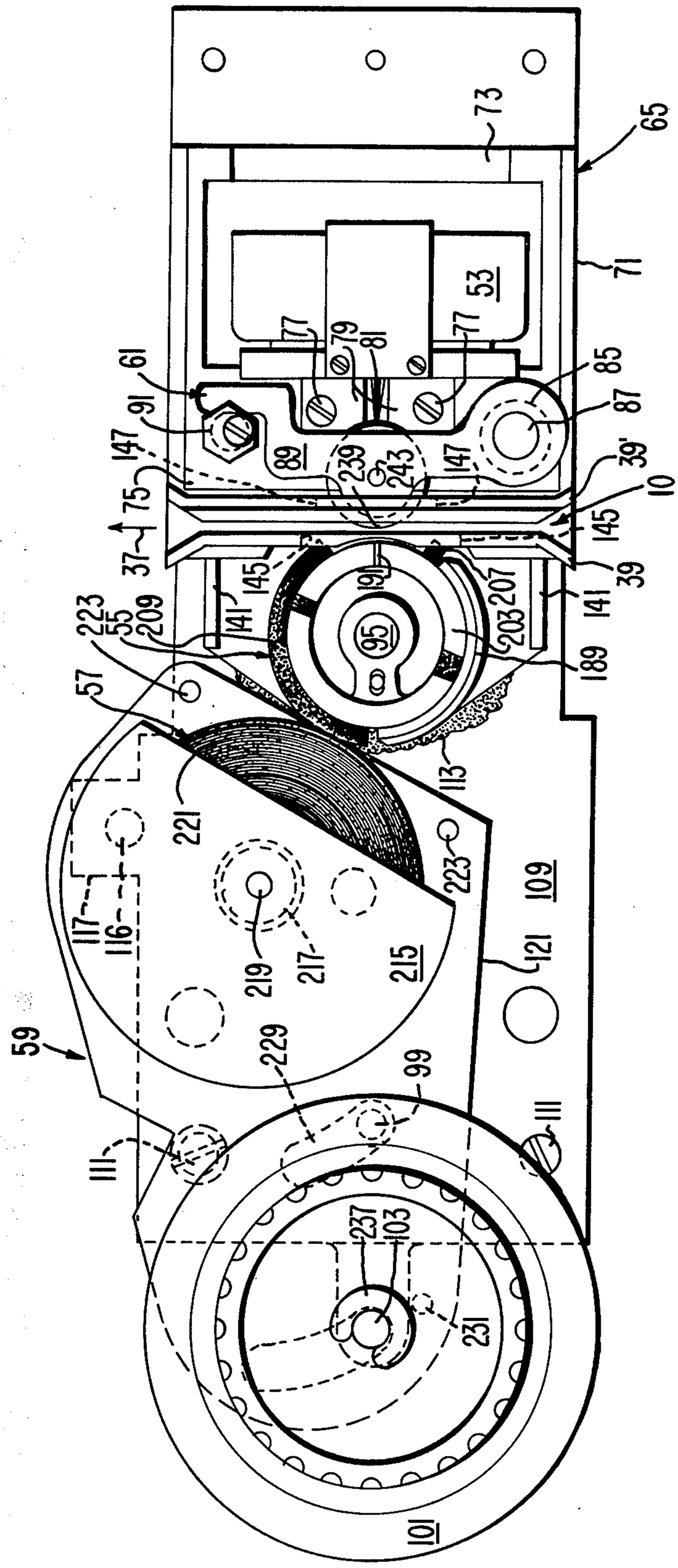
55
83
69
67
101
57
221
89
87
85
71
73
65
13
223
39'
39
35
35'
29
31
31'
37

FIG.2.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65
71
53
77
79
81
77
61
91
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147
89
239
243
147
39'
10
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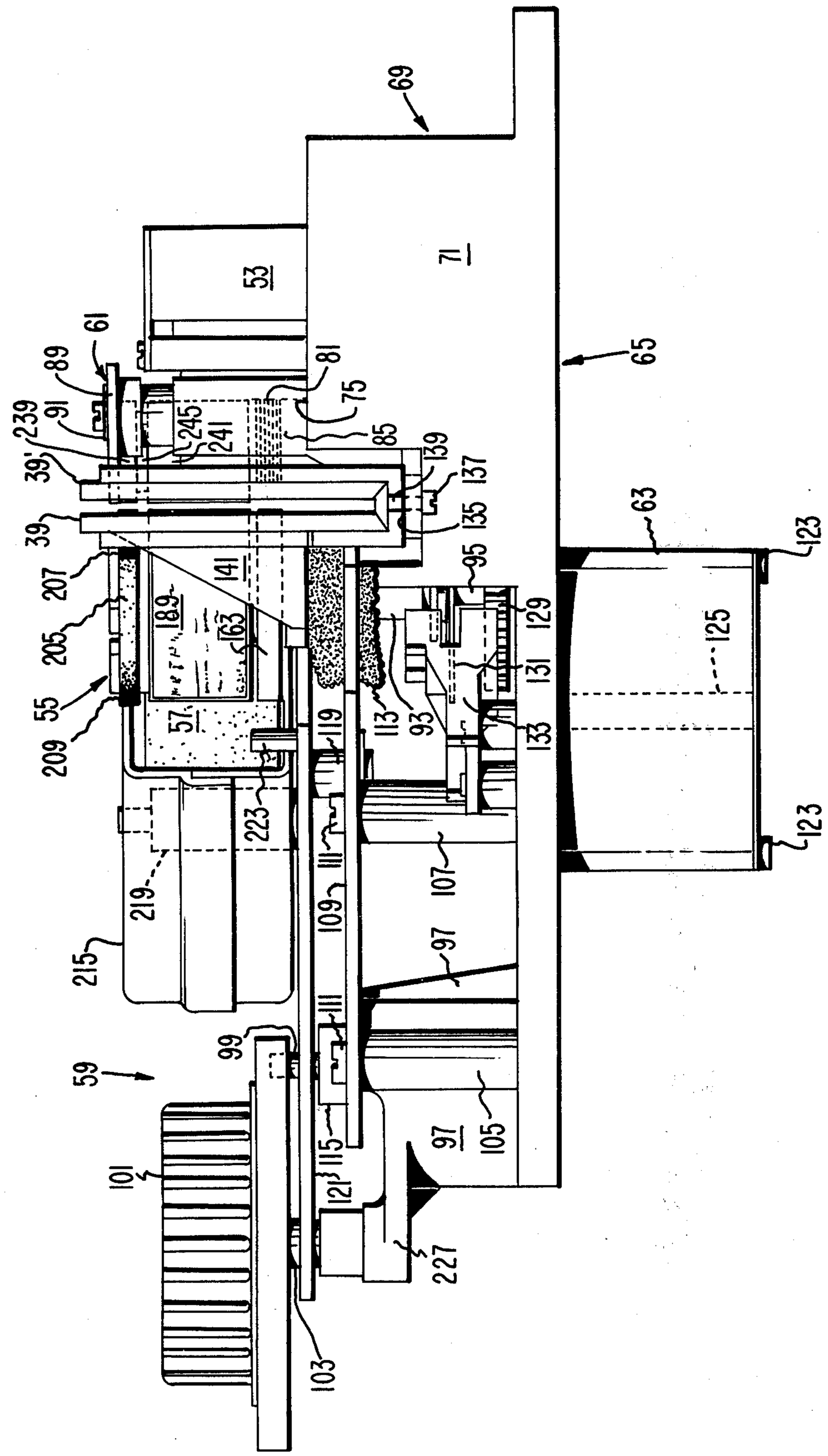
37
145
145
39
191
207
141
223
55
209
141
203
95
189
57
221
113
223
109
117
116
219
217
215
121
59
229
99
111
111
237
103
231
101

FIG. 5.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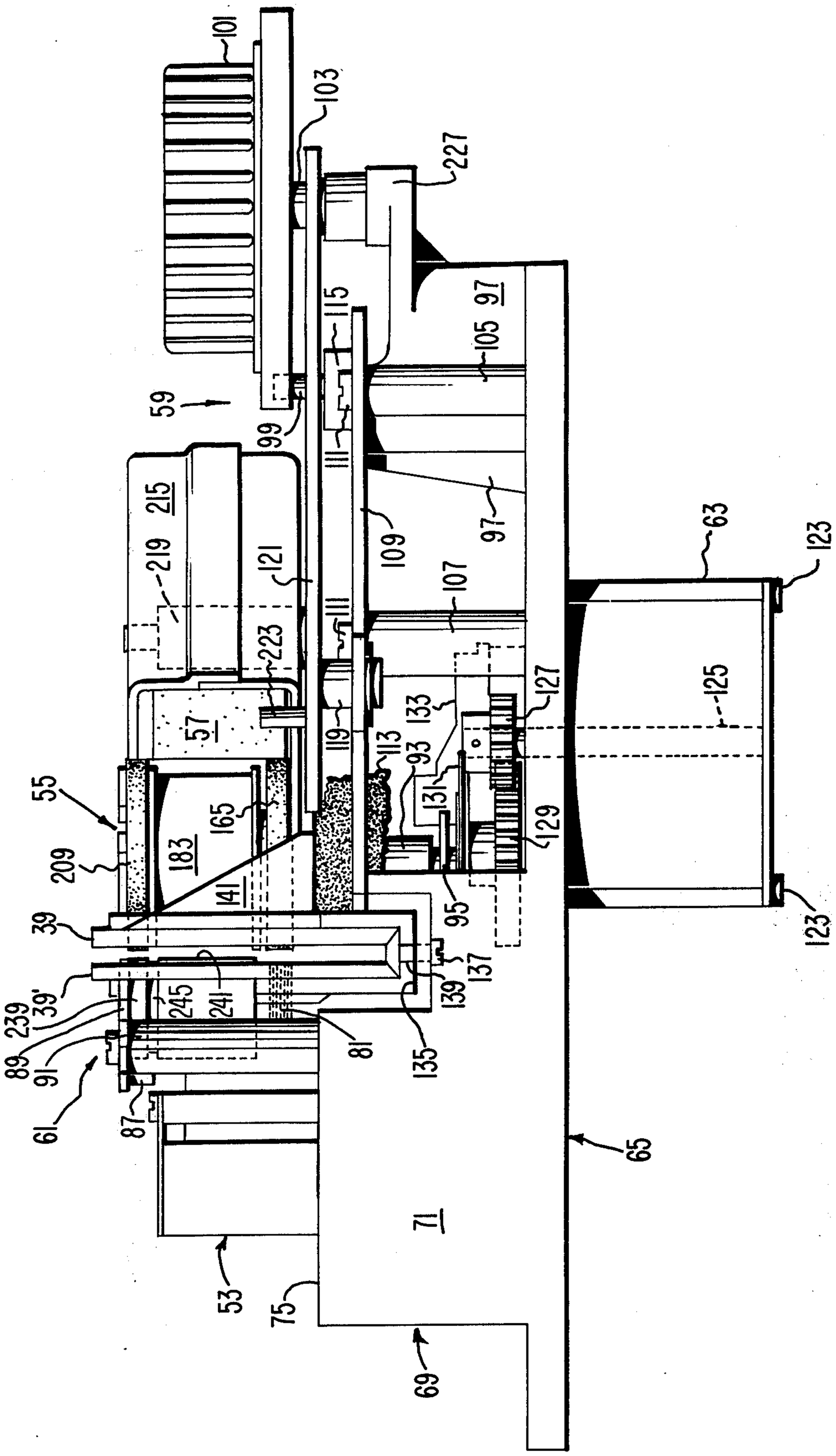
71
53
61
89
91
239
39'
39
207
205
55
209
189
163
141
57
223
219
215
59
101
99
103
81
75
85
245
241
139
137
135
95
129
131
133
113
93
119
121
115
107
109
97
105
227
65
63
123
125

FIG.6.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219
121
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109
107
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123
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119
113
93
131
129
55
209
183
165
141
95
39
137
39'
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91
81
135
61
87
53
75
71
69
65

FIG. 7.

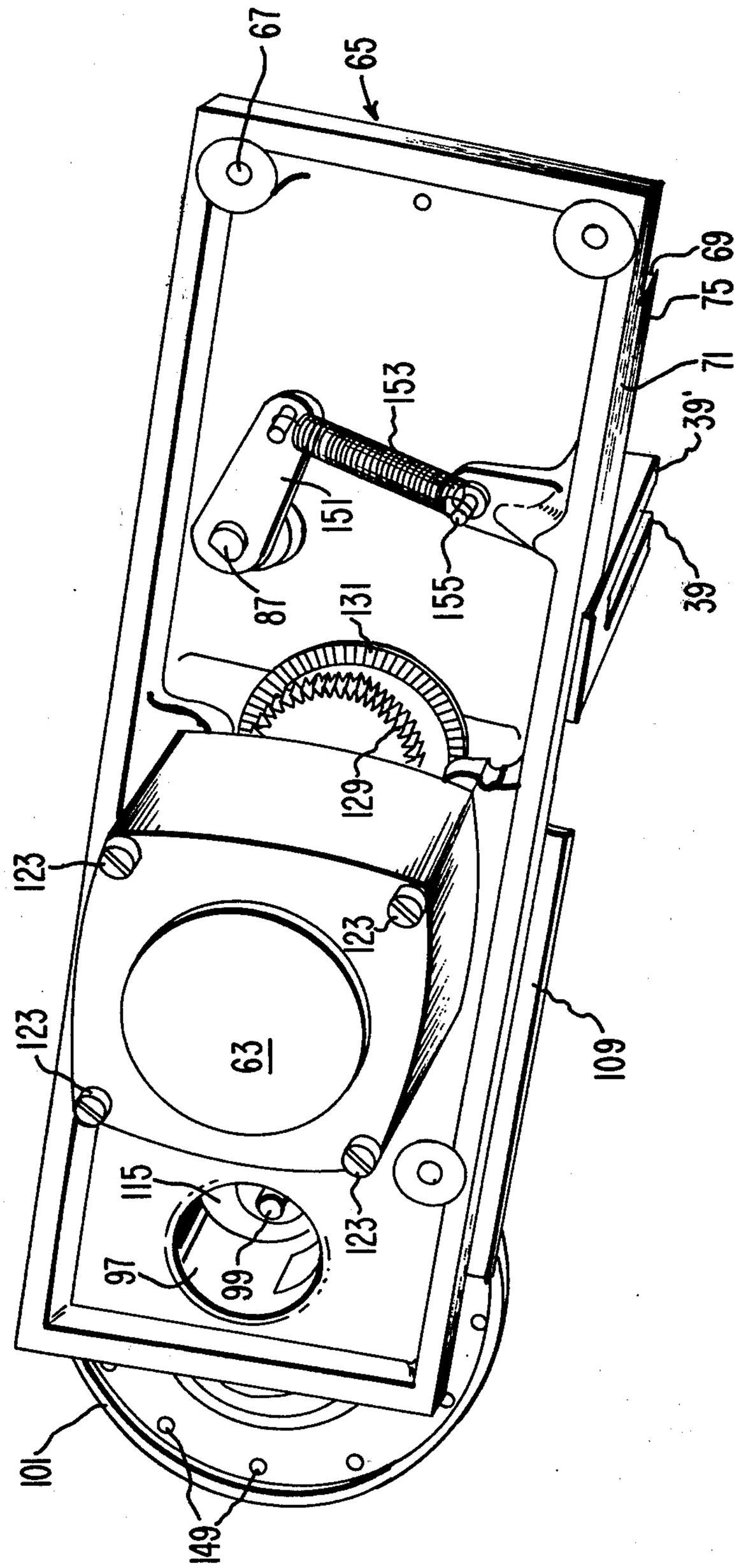
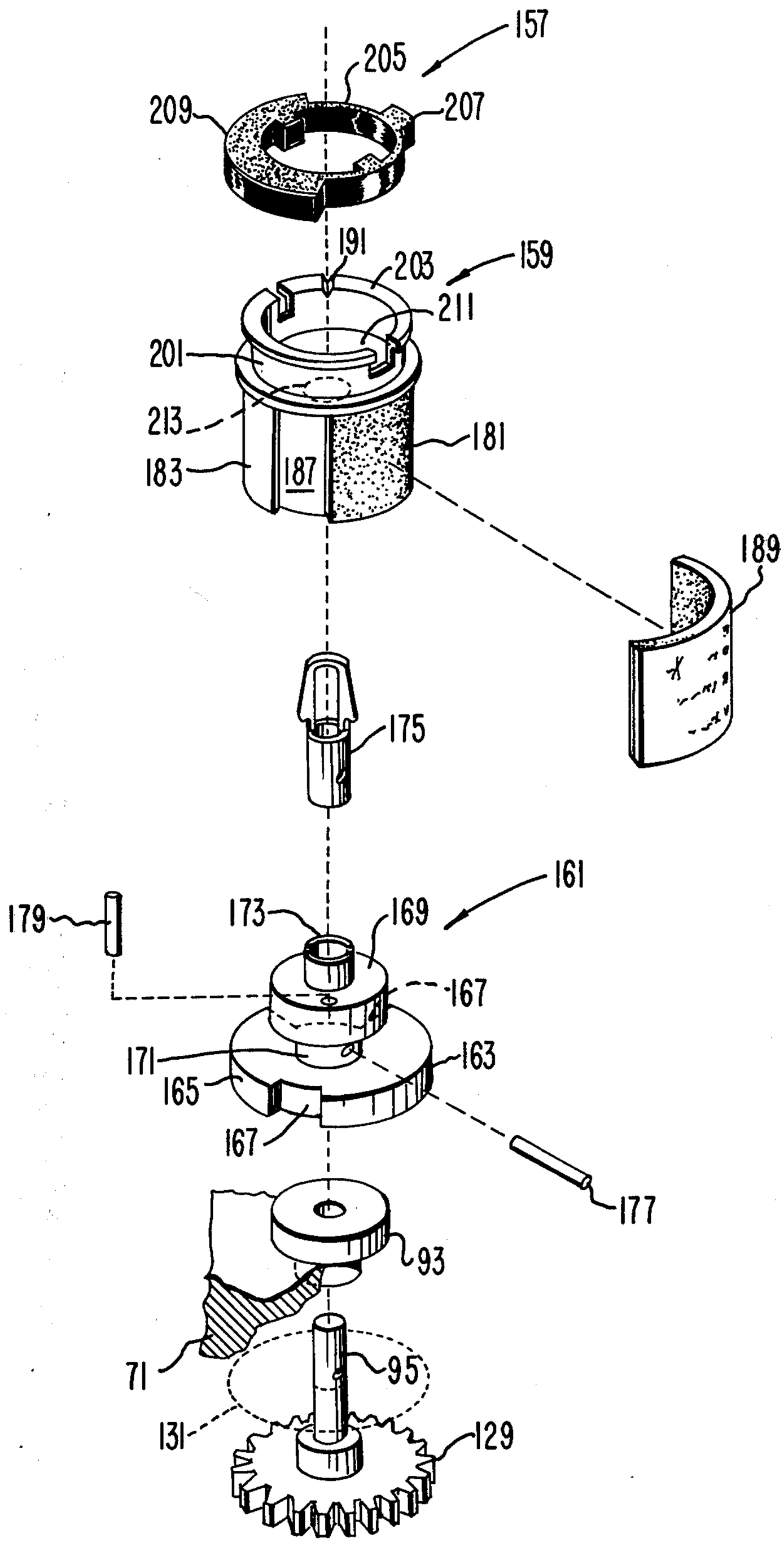

67
65
69
75
71
39'
39
153
151
87
155
131
129
123
63
109
115
97
99
101
149

FIG.8.

FIG. 9.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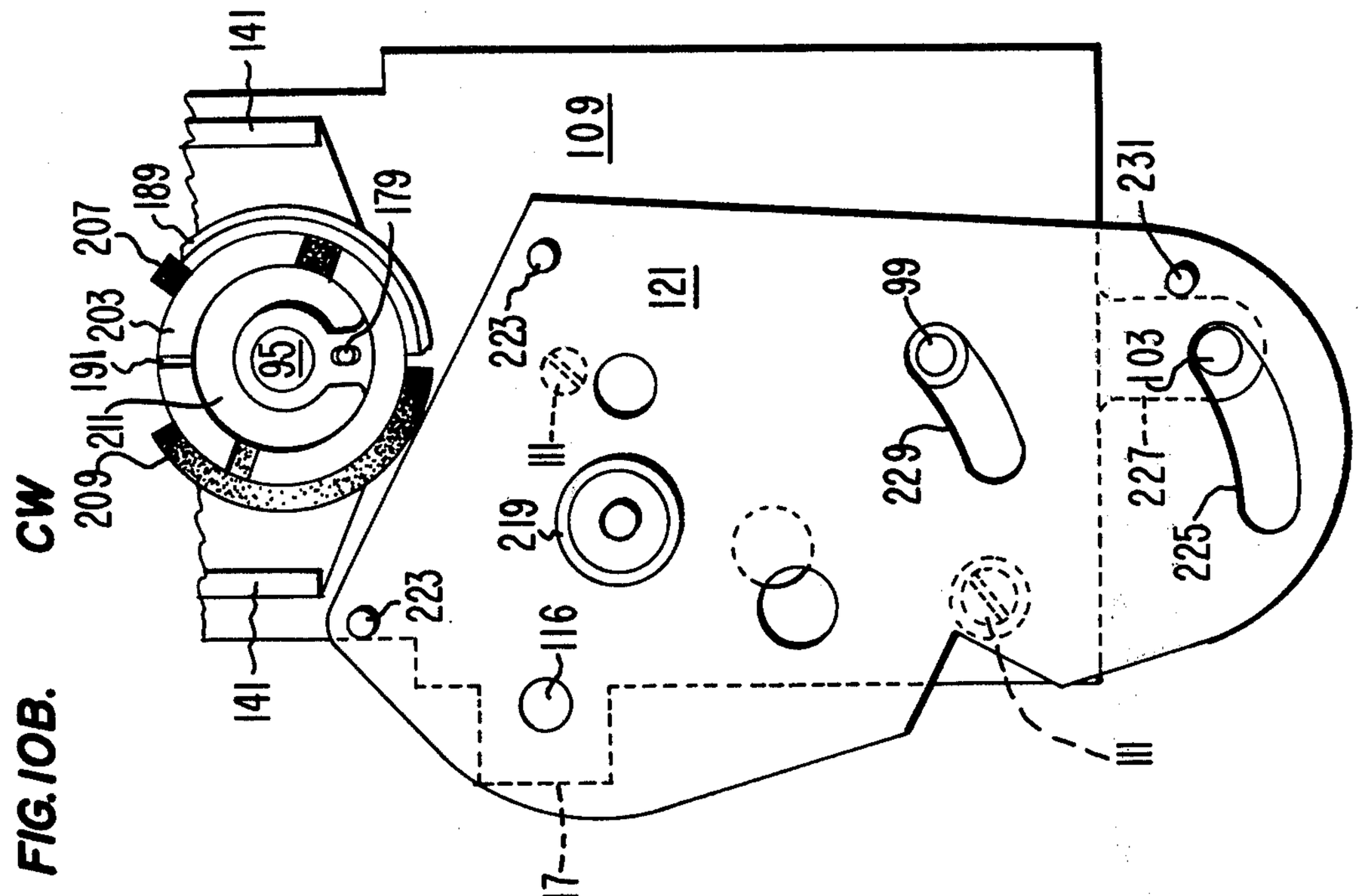
CW
141
189
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179
109
231
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121
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111
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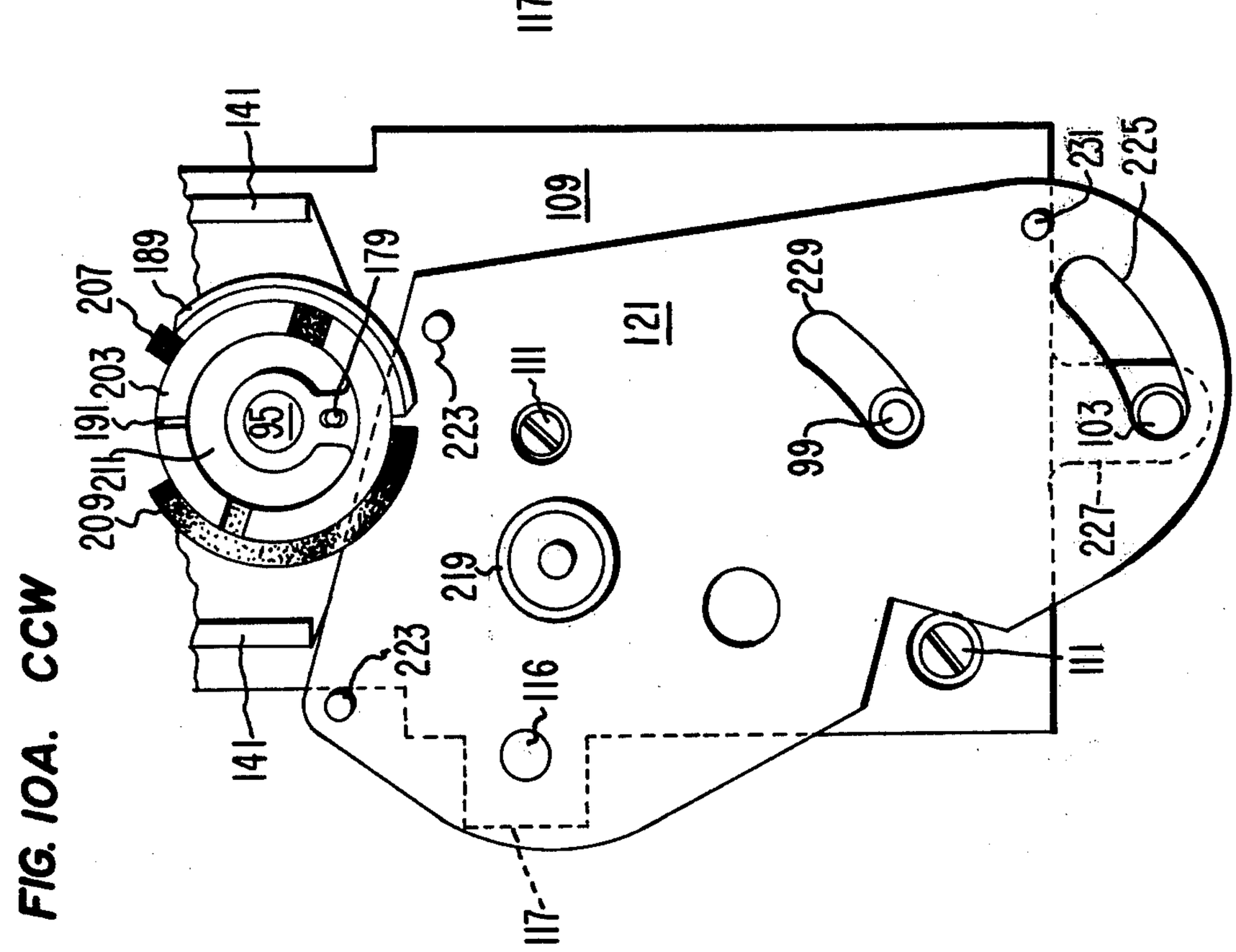
219
225
223
116
111
7
FIG. 10B.


CCW
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189
207
179
109
231
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111
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227
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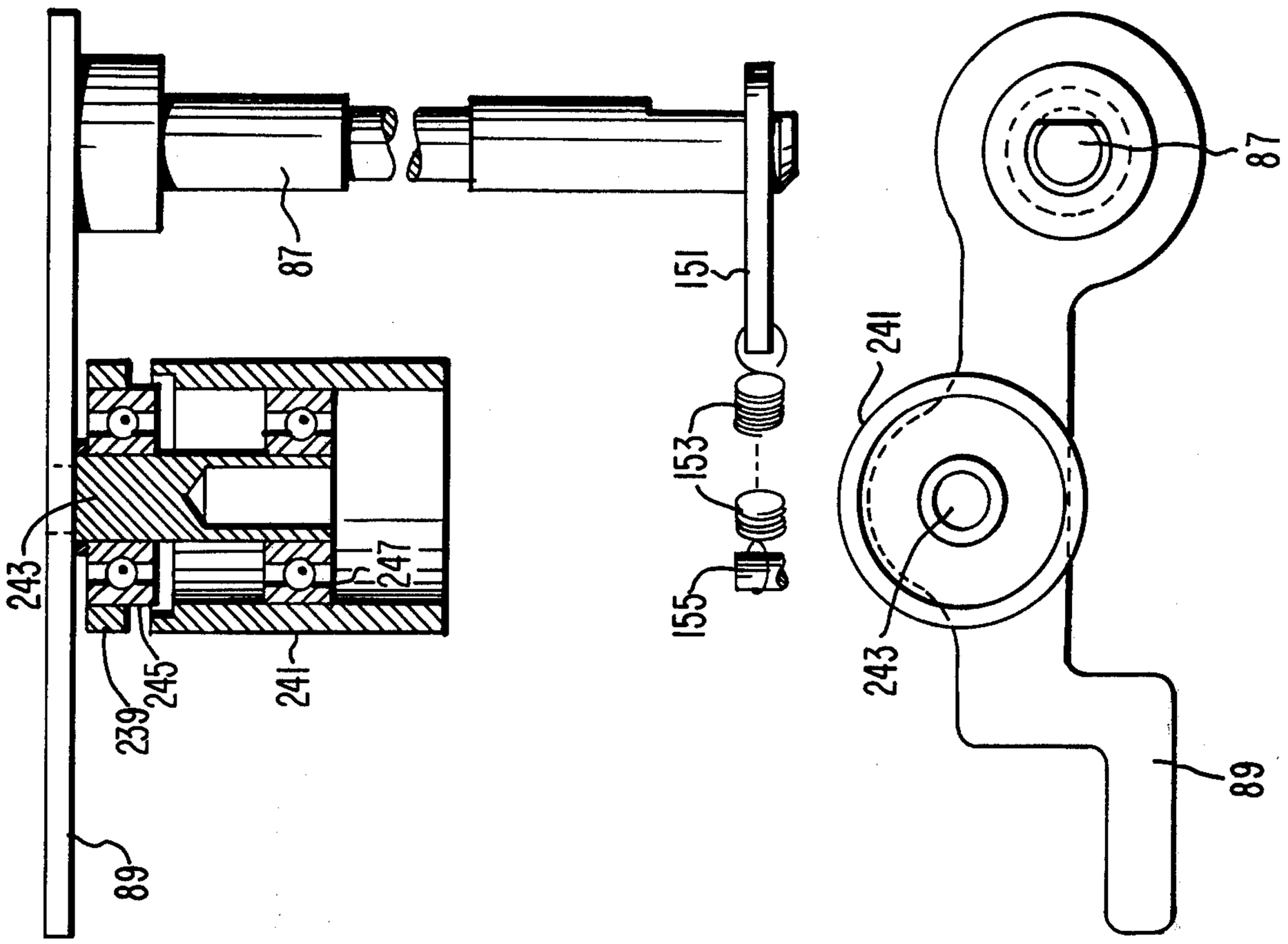
223
116
111
117
FIG. 10A.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87
241
243
89

FIG. 12.

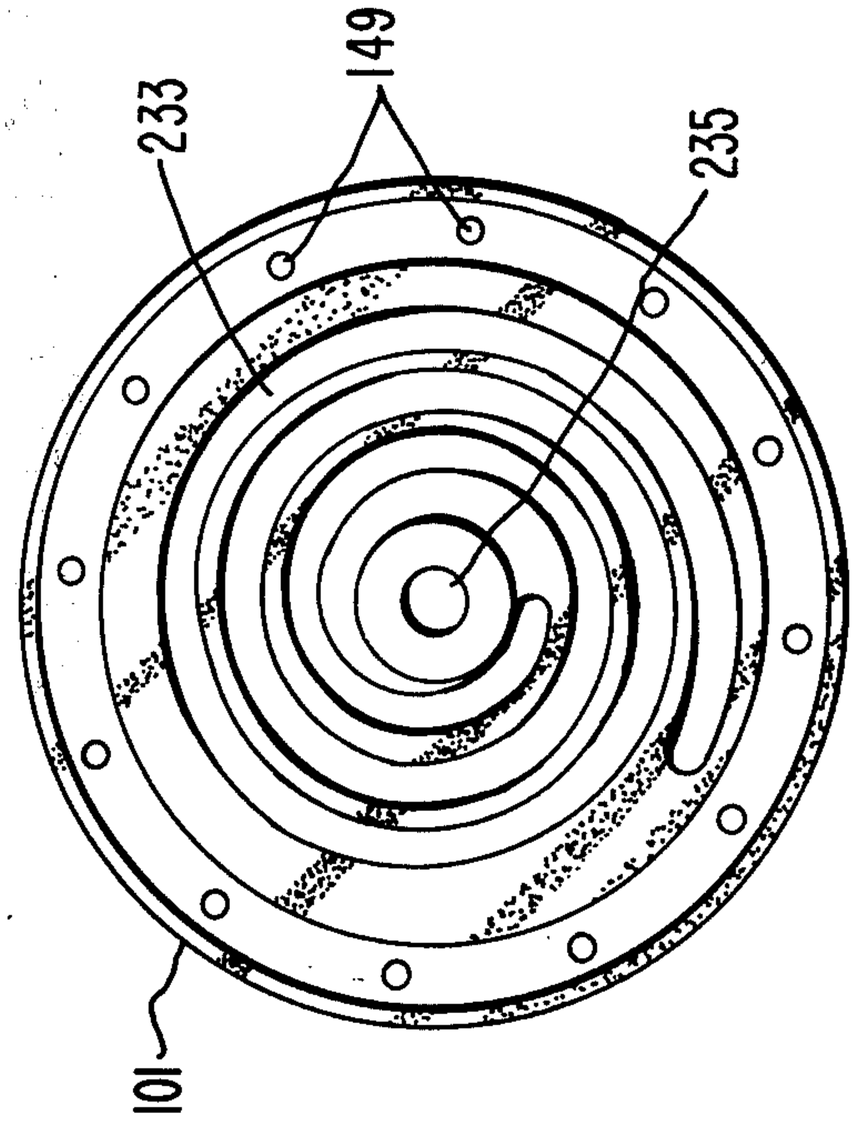
233
149
235
101

FIG. 11.

IMPROVED INKING APPARATUS

This is a division of application Ser. No. 650,707, filed Jan. 20, 1976, now U.S. Pat. No. 4,069,755.

CROSS REFERENCE TO RELATED APPLICATIONS

The ribbonless endorser of the present invention may be used, for example, in the Modular Document Encoder shown in U.S. Ser. No. D-574,722 filed on May 5, 1975 by R. Clayton and R. Schade, now abandoned, and in association with structures and devices disclosed in the following related United States patent applications, said applications all being assigned to the assignee of the present application:

U.S. Ser. No. 642,061 filed Dec. 18, 1975 by K. Christou and K. Kruklitis, now U.S. Pat. No. 4,031,359 entitled "A Straight Line Road System";

U.S. Ser. No. 573,787 filed May 1, 1975 by W. Templeton, now U.S. Pat. No. 3,972,522 entitled "Method And Apparatus For Identifying Characters Printed On A Document Which Cannot Be Machine Read";

U.S. Ser. No. 609,222 filed Sept. 2, 1975 by H. Wallace, now U.S. Pat. No. 3,922,522 entitled "Document View Station";

U.S. Ser. No. 608,567 filed August 28, 1975 by W. Templeton, now U.S. Pat. No. 4,028,286 entitled "Method And Apparatus For Driving A Document Through An Encoder Station";

U.S. Ser. No. 591,856 filed June 30, 1975 by J. Neri and J. Williams, now U.S. Pat. No. 4,028,286 entitled "Ink Transfer Member";

U.S. Ser. No. 650,723 filed Jan. 20, 1976 by J. Beery, now U.S. Pat. No. 4,033,444 entitled "Improved Pin Printer Life Utilizing Pin Shifting";

U.S. Ser. No. 897,687 filed Apr. 19, 1978 by J. Beery entitled "Optical Tachometer Using An Apertured Collimating Device";

U.S. Ser. No. 773,007 filed Feb. 28, 1977 by J. Haas, now U.S. Pat. No. 4,088,982 entitled "Dot Printer Delay Correction By Line Frequency Synchronization"; and

BACKGROUND OF THE INVENTION

Known endorsers for printing information either on the front or rear sides of documents such as checks have generally provided for the printing of fixed or constant information by means of a rotating legend-carrying print head that serves to impress an inked ribbon into contact with the document. Other of these known endorsers have provided for the printing of variable information by means of such complex devices as ink jet printers wherein uniformly sized droplets of ink are pressurably ejected from a nozzle and variably deflected electrostatically or magnetically in free flight towards the moving document, the movement of the document in concert with the variable vertical sweeps of the droplet stream serving to form the individual characters of the variable information.

The prior art fixed information endorsers, in addition to being ineffective for printing variable information, have generally required inked ribbons and their associated troublesome and space-taking feed and reverse mechanisms, and the prior art variable information endorsers, although appropriate for use in large scale document processing equipment, have generally proven to be too expensive for use in smaller scale cost effective special purpose equipment such as document encoders,

the primary objective of such special purpose equipment being the preliminary encoding and sorting of documents preparatory to subsequent automatic processing.

SUMMARY OF THE INVENTION

It is accordingly an object of the present invention to provide a low cost and reliable document endorser that is effective for printing both fixed and variable information on documents as they are transported at a controlled speed along a document transport path.

It is another object of the present invention to provide a fixed and variable information endorser wherein neither the fixed information nor the variable information requires the use of an inked ribbon and its complex and troublesome feed and reverse devices.

It is still a further object of the present invention to provide a document endorser that affords a highly flexible output capability, and wherein common element are employed in the printing of both the fixed and variable information.

An important aspect of the present invention is the use in a unitary device of a wire matrix printer for printing variable information on the documents, and a rotatable legend-carrying ink stamp for printing predetermined fixed information thereon, common multipurpose elements being employed in printing both the fixed and variable information and for controlling the speed of movement of the documents throughout each endorsing cycle.

Another important aspect of the present invention is the employment of a simple and readily accessible ink supply member in lieu of one or more feedable and reversible inked ribbons in the printing of both the fixed and variable information, such ink supply member requiring a minimum of operating parts to transfer the ink both to the wire matrix printer and to the ink stamp printer.

BRIEF DESCRIPTION OF THE DRAWING

These and other objects, advantages and features of the invention will become more readily apparent from the following detailed description when read in conjunction with the accompanying drawing figures, in which:

FIG. **1** is a perspective view of a modular document encoder in which the inventive unitary endorser may be used;

FIG. **2** is a front perspective view of the endorser station of the modular document encoder in relationship to upstream and downstream sections of the document transport path thereof;

FIG. **3** is a block diagram generally illustrating drive means for transporting documents at a first speed both upstream and downstream of the endorser station, and for transporting the documents at a second slower speed through the transport path defining the endorser station;

FIG. **4** is a block diagram illustrating the arrangement of various of the elements of the unitary endorser along the transport path in the area of the endorser station;

FIG. **5** is a plan view of the inventive endorser unit showing the relationship of various of its operating elements;

FIG. **6** is a left side view of the endorser showing additional elements thereof;

FIG. **7** is a right side view of the endorser unit otherwise illustrated in FIGS. **5** and **6**;

FIG. 8 is a bottom perspective view of the endorser unit showing additional details of its unitary assembly;

FIG. 9 is an exploded view of the endorser head assembly showing the velocity control element, the ink stamp and the curvilinear platen thereof;

FIGS. 10A and 10B are plan views of the adjustable friction setting means of the ink transfer member as disposed in its clockwise and counterclockwise-rocked positions, the adjusting knob of the friction setting means having been removed to expose normally hidden details;

FIG. 11 is a bottom view of the adjusting knob of the friction setting means showing the spiral groove and the plurality of spaced apart detent receiving indentations formed therein; and

FIG. 12 is a view of the biased back-up support means that yieldably cooperates with the velocity control element and the ink stamp of the endorser head assembly shown in FIG. 9.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The ribbonless endorser for printing both fixed and variable information on documents may be utilized in any document processing equipment wherein, as an incident to such processing, it is desired to record an endorsement on either the front or rear sides of the documents. It may be used effectively, for example, in the Modular Document Processing Encoder illustrated in FIG. 1 and disclosed by R. Clayton and R. Schade in U.S. Ser. No. D-574,722 filed on May 5, 1975, now abandoned. In the particular document processing encoder shown in FIG. 1, a quantity of documents such as bank checks that have been received by a bank and that are to be amount encoded in MICR characters would be edge-stacked in a hopper 3, individually removed from the hopper and viewed by the operator, the operator then proceeding to enter the amount of each check by means of a keyboard 5. In the event the intended amount appears on a display panel 7, the operator would drop the individual checks into a chute 9 whereupon they would be activated along a document transport path 10 to an encoding station generally designated at 11 where the amount entered by means of the keyboard would be encoded in MICR characters. Following the encoding of the amount at the encoding station 11, the checks would be transported to or through an endorsing station generally designated at 13 where information peculiar or unique to the processing bank might be recorded on the checks, the checks being thereafter transported to selected ones of a plurality of stacking pockets generally designated at 15.

The modular document processing encoder illustrated in FIG. 1, and for which the endorser unit of the present invention was particularly designed, may also be used for verifying the machine readability of the MICR encoded characters recorded on the checks, including the above referenced amount encoded characters and the pre-recorded characters of a customer and bank identifying nature. To accomplish such verification, a quantity of encoded checks would be edge-stacked in a hopper 17 and dropped individually by the operator into a chute 19 where they would be transported along the document transport path through a read station generally designated at 21, a dot printer station generally designated at 23, a document view station 25, the previously mentioned encoder station 11, and then through the endorser station 13 to selected ones of the pockets 15, according to the bank identifying characters that were read at the read station 21. During this verification of the machine readability of the encoded characters on the checks, each of the encoded characters would be exposed to a read head located at the read station 21, after having first been magnetized by a write head also located at the read station. In the event all of the encoded characters on a given check are read by the read head at the road station 21, the check would be transported without incident along the document transport path generally designated at 10, and through the various downstream stations to the selected pocket 15. Should one or more of the encoded characters on a given check not be read by the read head, however, the unread characters would be markably identified by a dot printer located at the dot printer station 23, the check being thereafter elevated at the document view station 25 for visual observation by the operator. The dot-identified unread characters would then be interpreted by the operator, and the correct characters entered by means of the keyboard 5. Upon re-entry of the unread character or characters, the check would then be transported to the encoding station 11 where encoding of the re-entered characters would occur, the check being thereafter transported through the endorser station 13 to the selected pocket 15.

To elaborate further on the particular structure of the Modular Document Processing Encoder illustrated in FIG. 1, the "Straight Line Read System" disclosed by K. Christou and K. Kruklitis in, now U.S. Pat. No. 4,031,359 might be located at the read station 21, the "Apparatus For Identifying Characters Printed On A Document Which Cannot Be Machine Read" disclosed by W. Templeton in U.S. Pat. No. 4,068,212, might be located at the dot printer station 23, the "Document View Station" disclosed by H. Wallace in U.S. Pat. No. 3,972,555 might be located at station 25, the "Apparatus For Driving A Document Through An Encoder Station" disclosed by W. Templeton in U.S. Pat. No. 4,015,701 might be located at the encoder station 11, and with the ribbonless endorser of the present application located at station 13.

As illustrated in FIG. 2, the endorser station generally designated at 13 in FIG. 1, in addition to the endorser unit of the present invention which is generally designated at 27, might also be comprised of a base plate 29, a pair of upstream path-defining walls 31, 31', a pair of downstream path-defining walls 33, 33', and pairs of drive means or rollers 35, 35' that are operatively disposed along the upstream and downstream path-defining walls for transporting at a predetermined transport speed in the direction of the arrows 37. Intermediate the pairs of path-defining walls 31, 31' and 33, 33', are a pair of path-defining walls 39, 39' defining the transport path in the area of the endorser station, the documents or checks being transported at a controlled reduced speed therealong as the fixed and variable information is endorsably printed on the documents. FIG. 3 is illustrative of the manner in which a document being transported along the document transport path 10 and through the various upstream stations shown in FIG. 1 may be transported at a relatively high transport speed in the upstream pathway 31, 31', decelerated to a controlled slower endorsing speed in the endorser pathway 39, 39', and then re-accelerated to the relatively high transport speed in the downstream pathway 33, 33'. For this purpose an upstream and downstream drive designated at

41 in FIG. 3 might serve to control the relatively high transport speed of the documents in the pathway areas adjacent the endorser transport path 39, 39', by providing speed control functions to the drive means 35, 35' along the lines 43, with an endorser control designated by the block 45 serving to supply speed control functions to an endorser drive 47 along a line 49 upon receipt of an endorse initiate signal from a central processor or other extraneous logic system along the line 51.

As best illustrated in FIGS. 2, 5, 6 and 7, the unitary endorsing device of the present invention is comprised of a wire matrix printer generally designated at 53 for printing variable information on the documents, an endorser head assembly generally designated 55 and comprised of a plurality of hereinafter described operating elements, an ink transfer member 57, means generally designated at 59 for maintaining a minimal frictional contact between the ink transfer member 57 and the endorser head assembly 55, biased means generally designated at 61 for providing back-up support to the velocity control element and ink stamp of the endorser head assembly 55, and a drive motor 63 responsive to logic circuitry for rotating the endorser head assembly 55 at a controlled speed during each endorsing cycle. The endorser unit generally designated at 27 in FIG. 2 is supported by a casting 65 that is best illustrated in FIGS. 2, 6, 7 and 8, such casting being attached to the base plate 29 by means of a plurality of front and rear fasteners or screws 67. A semi-circular housing portion 69 is provided in the casting 65 for securably locating the wire matrix printer 53, such housing portion being comprised of a pair of vertical side walls 71, a cutaway front end wall 73, and a ledge-forming rear wall 75. The wire matrix printer 53, as best illustrated in FIG. 5, is supported in the housing portion 69 by means of a pair of screws 77 passing through apertures formed in a pair of brackets 79 that are integrally formed with the wire matrix printer, such screws cooperating with threads formed in the ledge of the rear wall 75. The space between the brackets 79 serves as a guideway 81 for nine vertically arranged pins of the wire matrix printer 53, the desired variable information being endorsably printed on the documents by selectively energizing nine radially arranged pin-activating solenoids 83 as best shown in FIG. 2. Logic circuitry for the selective activation of the nine radially arranged solenoids 83, and for conservationally activating seven of the nine pins that are vertically arranged in the guideway 81 is disclosed in previously referenced U.S. Pat. No. 4,033,444 by J. Beery.

Extending upwardly from the ledge-forming rear wall 75 of the housing portion 69, as best shown in FIG. 6, is a first bearing mount 85 for supporting a rotatable shaft 87 (FIG. 5) of the hereinafter described biased back-up means 61, the shaft 87 being biased in a counterclockwise direction as viewed in FIG. 5 to yieldably limit a roller carrying arm 89 against an adjustable limit stop 91 that is fixed to the ledge 75.

The casting 65, as best shown in FIGS. 6 and 7, is also provided with a second bearing mount 93 for supporting a shaft 95 of the endorser head assembly 55, and with a third bearing mount 97 for translatably supporting a biased detent 99 that positionably cooperates with a plurality of hereinafter described radially arranged indentions on the lower surface of an adjusting knob 101, and for supporting a short shaft 103 about which the adjusting knob 101 may be rotated. The casting 65 is additionally provided with a pair of integrally formed rear supporting posts 105 disposed on either side of the third bearing mount 97, and an integrally formed forward supporting post 107, such supporting posts serving to position an anchor plate 109 by means of locating screws 111. The anchor plate 109, in addition to being positionably located by the supporting posts 105, 107, and the screws 111, is also cushionably supported at its frontmost extremity by means of a shoulder (not shown) that is formed in the second bearing mount 93, a matting of any suitable resilient material 113 serving to mechanically insulate the anchor plate 109 from the bearing 93 and from the endorser head assembly 55. The anchor plate 109 is provided with an aperture (not shown) for accommodating a collar housing 115 for the biased detent 99, such collar housing being fixed to the uppermost extremity of the third bearing mount 97. An aperture 116 formed in an extension 117 of the anchor plate 109, as best illustrated in FIGS. 5, 10A and 10B, serves to rotatably accommodate a pivot post 119 (FIG. 7) that is fixed to a pivotally operable friction setting plate 121 the function of which is hereinafter described.

The casting 65 also serves to support the drive motor 63 which depends from the bottom surface thereof and extends through an opening formed in the base plate 29, the housing of the motor 63 being provided with a plurality of peripheral apertures for accommodating a plurality of fasteners 123 that pass through corresponding apertures formed in the casting 65, as best illustrated in FIG. 8. Also passing through an aperture formed in the casting 65 is a geared motor shaft 125, a pinion gear 127 fixed thereto being cooperably engaged with the teeth of a spur gear 129 fixed to the lowermost extremity of the shaft 95 of the endorser head assembly 55. Also fixed to the shaft 95 of the endorser head assembly is an apertured disk 131 disposed in cooperating relationship with an LED and photodetector device 133 (FIG. 6), such apertured disk and photodetector device being the subject matter of U.S. Ser. No. 897,687 filed by J. Beery on Apr. 19, 1978 and entitled "Optical Tachometer Using An Apertured Collimating Device".

The casting 65 is also provided with a depressed surface 135 disposed in adjacent relationship to the ledge 75, as best illustrated in FIGS. 6 and 7, such surface serving to support the path-defining wall 39' and the integrally formed lower portion of the wall 39. A plurality of threaded bolts 137 pass through apertures formed in the depressed surface 135 and grippably cooperate with the interior walls of a plurality of sleeves 139 which are integrally formed with the path-defining wall 39'. The upper portion of the path-defining wall 39 is supported by a pair of integrally formed flaired members 141 that are anchored to the second bearing mount 93 contiguous to the upper surface of the resilient material 113. The path-defining wall 39 is provided with a central rectangularly shaped aperture designated by the broken lines 145 in FIG. 5, to permit the rotatable projection of various elements of the endorser head assembly 55 into the document transport path and into cooperation with documents passing therethrough, and the path-defining wall 39' is provided with a central rectangularly shaped aperture designated by the broken lines 147 whereby the roller assembly of the biased back-up means 61 and carried by the arm 89 is permitted entry into the document pathway to provide back-up support to a document that is disposed in cooperating relationship with the various elements of the endorser head assembly 55.

FIG. 8 of the drawing shows the inner surface of the third bearing mount **97**, the biased detent **99**, and the collar housing **115** for translatably supporting the detent. Also shown in FIG. **8** are the previously mentioned locating indentions **149** that are formed in the bottom surface of the adjusting knob **101**, such indentions being selectively engaged by the detent **99** to adjustably locate the pivotably operable friction setting plate **121** in such manner as to establish a minimal frictional contact between the ink transfer member **57** and various elements of the endorser head assembly **55**. FIG. **8** also shows the means whereby the previously referenced back-up support means **61** is biased with the roller carrying arm **89** thereof normally held in contact with the adjustable limit stop **91** (FIG. **5**), such biasing means including an arm **151** fixed to the lowermost extremity of the shaft **87**, and a spring **153** connecting the arm **151** and an anchor pin **155** fixed to the lower surface of the casting **65**.

The endorser head assembly **55** shown to be mounted on a rotatable shaft **95** in FIG. **5**, and to be rotatable by the drive motor **63** through the coupling of the pinion gear **127** and the spur gear **129** in FIG. **7**, can best be described with reference to FIG. **9**. Forming a part of the endorser head assembly **55** is a velocity control element **157**, an ink stamp supporting element **159**, and a platen element **161**. The platen element **161** is comprised of a pair of exposed concentric arcuate surfaces **163** and **165** which are separated by a pair of recesses **167**, an enlarged hub port on **169**, an interconnecting sleeve portion **171**, and an upwardly extending slotted sleeve portion **173**. The sleeve portions **171** and **173** and the enlarged hub portion **169** are provided with an inner diameter of predetermined greater dimension than the outer diameter of the rotatable shaft **95**, such than an insert sleeve **175** made of a resilient material may be retainably introduced therebetween. The platen element **161** is fixed to the shaft **95** by means of a dowel pin **177** passing through apertures formed in the sleeves **171** and **175** and the shaft **95**. The platen element **161** is also provided with a vertically extending locating pin **179** disposed on the upper surface of the hub portion **169**, the purpose of such locating pin being described hereinafter.

The ink stamp supporting element **159** is comprised of a pair of concentric arcuate surfaces **181** and **183** which are separated by a pair of oppositely disposed recesses **187** (only one of which is shown). An ink stamp **189** containing the fixed information is adhesively attached to the arcuate surface **181**, with a second ink stamp (not shown) optionally attached in line manner to the arcuate surface **183** in the event the desired fixed information cannot be accommodated by a single ink stamp. The recess **187** opposite the one shown in FIG. **9**, together with the corresponding recess **167** of the platen element **161**, serve to define the home position of the endorser head assembly **55**, the home positioning of the assembly being achieved when these recesses and a home designating mark **191** formed in the upper rim thereof are angularly disposed in coincidence with the rectangularly shaped aperture formed in the path-defining wall **39**, as best illustrated in FIG. **5**. The ink stamp supporting element **159**, in addition to the arcuate surfaces **181** and **183** and recesses **187**, is also provided with a circular channel **201** formed by an interrupted rim **203** which bears the home designating mark **191**. The circular channel **201** serves to support an elastomeric band **205** that substantially comprises the velocity control element **157**. The band **205** is provided with a first relatively narrow projection **207** disposed at a point contiguous to the leading edge of the ink stamp **189**, and a second relatively wide projection **209** which extends from the trailing edge of the ink stamp **189** and terminates at a point coincident with the trailing edge of the arcuate surface **183**. To provide further elaboration upon the relationship of the projections **207** and **209** of the velocity control element **157** and the ink stamp **189**, it can be seen from FIG. **5** that when the endorser head assembly **55** is disposed in its home position the projections **207** and **209** of the velocity control element **157**, the ink stamp **189** and arcuate surface **183** of the ink stamp supporting element **159**, and the arcuate surfaces **163** and **165** of the platen element **161** are all displaced from the aperture formed in the path-defining wall **39**, and that upon the counterclockwise rotation of the shaft **95** and endorser head assembly **55** the first projection **207** of the velocity control element **157** serves to intercept a document moving at a high transit speed along the passageway **10**, and to deceleratably impinge the document against a hereinafter described first roller of the back-up support means **61**. Following the deceleration of the document by the projection **207** and first roller of the back-up means **61**, the ink stamp **189** in cooperation with a second roller of the back-up support means **61** serves both to endorsably print the fixed information contained thereon and to control the speed of movement of the document during such printing. Following the printing of the fixed information by the ink stamp **189**, the reduced speed movement of the document through the endorser station is maintained by the relatively wide projection **209** of the velocity control element **157** in cooperation with the first roller of the back-up support means **61**. Upon completion of the 360° rotation of the shaft **95** the endorser head assembly **55** is returned to its home position as shown in FIG. **5**, the various elements of the assembly being again displaced from the rectangularly shaped aperture in the path-defining wall **39**, and displaced also from a position of possible interference in the document pathway.

The ink stamp supporting element **159** is provided with a lower interior chamber of such dimension as to provide a slip fit with the enlarged hub portion **169** of the platen element **161**, when assembled thereon. A circular partition **211** formed in the ink stamp supporting element **159**, midway of its extremities, is provided with a central circular aperture **213** for receiving the upwardly extending slotted sleeve **173** of the platen element **161**, and provided also with an adjoining smaller aperture (not shown) for receiving the vertically extending locating pin **179** of the hub portion **169**. With the ink stamp supporting element **159** assembled on the home positioned platen element **161**, the various elements of the endorser head assembly will appear as generally represented in FIGS. **5 6**, and **7** with the exposed arcuate surfaces **163** and **165** of the platen element **161** disposed in cooperable print-receiving relationship with the pins of the wire matrix printer **53**, with the ink stamp **189** disposed in cooperable print-producing relationship with the second roller of the biased back-up support means **61**, and with the velocity control elements **207** and **209** disposed in cooperable document-decelerating relationship with the first roller of the biased back-up support means **61**.

As indicated supra, the inventive unitary endorser includes an ink transfer member **57** and means designated at **59** for maintaining a minimal frictional contact

between the ink transfer member **57** and the endorser head assembly **55**. As illustrated in FIGS. **5**, **6** and **7** the ink transfer member **57**, forming the subject matter of U.S. Pat. No. 4,028,286 by J. Neri and J. Williams is rotatably housed within a cartridge **215** which in turn is rotatably supported on the friction setting plate **121**. The cartridge **215** is provided with a central aperture **217** (FIG. **5**) for receiving a mounting post **219** fixed to the friction setting plate **121**. A cutaway aperture **221** formed in the wall of the cartridge **215**, as best shown in FIGS. **2** and **5**, serves to provide exposure of the ink transfer member **57** to the endorser head assembly **55**, and a pair of spaced apart limit pins **223** fixed to the upper surface of the plate **121** serve to limitably cooperate with the bottom edge of the cartridge to prevent the cartridge from rotating into contact with the endorser head assembly **55**. As also indicated supra, the friction setting plate **121** is pivotably mounted on the anchor plate **109** by means of a pivot pin **119** fixed to the friction plate **121** and rotatably mounted in an aperture **116** formed in an extension **117** of the anchor plate **109**, as best illustrated in FIGS. **5** and **7**. The friction setting plate **121** may be pivotally activated as between the clockwise-rocked friction relieving position illustrated in FIG. **10B**, and the counterclockwise-rocked maximum friction position illustrated in FIG. **10A**, such positions being defined by the ends of an adjustment slot **225** formed in the plate **121** and the previously referenced short shaft **103** fixed to an offset arm **227** of the third bearing mount **97**. A second slot **229** formed in the friction plate **121** serves to accommodate the previously referenced biased detent **99** transversely supported by the collar housing **115** of the third bearing mount **97**.

As also best illustrated in FIGS. **5**, **10A** and **10B**, the friction setting plate **121** is provided with a fixed stud or pin **231** disposed adjacent an extremity of the adjustment slot **225**, such stud being engaged with a spiral groove **233** formed in the bottom surface of the adjusting knob **301**, as shown in FIG. **11**. The adjusting knob **101** is provided with a central aperture **235** by means of which the knob is mounted on the short shaft **103** and retained in position thereon by a C-shaped spring clip **237** disposed in a groove formed in the short shaft **103** contiguous to its uppermost extremity. The adjusting knob **101** is assembled on the short shaft **103** in such manner that the spiral groove **233** is engaged by the fixed stud **231**, the arrangement being such that the full counterclockwise rotation of the knob **101** will cammably activate the stud **231** to the minimum radius of the spiral groove **233**, to thereby dispose the friction setting plate **121** in its full clockwise-rocked friction-relieving position, and the clockwise rotation of the adjusting knob **101** will cammably activate the fixed stud **231** in the direction of the grooves maximum radius, to thereby adjustably dispose the friction setting plate **121** in a variable counterclockwise-rocked position wherein the ink transfer roller **57** is disposed in the desired frictional contact with the endorser head assembly **55**. The adjustment of the knob **101** and the ink transfer member **57** is maintained by the engagement of the biased detent **99** with one of the indentions **149** formed in the bottom surface of the knob outwardly of the spiral groove **233**.

It can be seen from FIGS. **6** and **7** that the elastomeric band **205** and projections **207** and **209** forming the velocity control member of the endorser head assembly **55** are disposed on a plane upwardly adjacent the ink transfer member **57**, and that the establishment of the desired frictional contact between the ink transfer member **57** and endorser head assembly **55** will not dispose a supply of ink on the elements of the velocity control member. On the other hand, the above described adjustment of the knob **101** will serve to establish a desired minimal contact between the ink transfer member **57** and both the ink stamp **189** and the arcuate surfaces **163** and **165** of the platen element **161**, rotation of the endorser head assembly **55** by the drive motor **63** accordingly bringing the ink stamp **189** and the arcuate surfaces **163** and **165** of the platen into rotating frictional relationship with the ink transfer member **57**, to thereby apply a coating of ink on said surfaces. The ink transfer member **57** is accordingly rotated a distance corresponding to the arcuate surfaces **163** and **165** during each revolution of the endorser head assembly **55**.

The previously mentioned biased back-up support means **61** with its rotatable shaft **87**, roller carrying arm **89**, and spring biased arm **151**, is shown in FIG. **12** to be comprised of a first hard-surfaced roller **239** and a second hard-surfaced roller **241**, said rollers being rotatably mounted on a common shaft **243** fixed to the arm **89**. The first roller **239** is rotatably supported by a first ball bearing raceway **245** and the second roller **241** is supported by a second ball bearing raceway **247**. As illustrated in FIGS. **6** and **7**, the first roller **239** provides biased back-up support for the velocity control projections **207** and **209** of the endorser head assembly **55** to thereby control the speed of travel of a document impinged therebetween, and the second roller **241** provides biased back-up support for the inked ink stamp **189**, to thereby print the legend carried to the ink stamp on a document impinged therebetween. The central support provided the second roller **241** by the relatively thin second ball bearing raceway **247** serves to accord the roller **241** with a self-centering characteristic, to further enhance the back-up capability of the roller with respect to the ink stamp **189**.

Operation

An understanding of the operation of the endorsing unit may be had with reference to FIGS. **3** and **4**. If can be seen from FIG. **4** that with the endorsing head assembly **55** disposed in its home position (as also shown in FIG. **5**) the various elements of the assembly are displaced from the document transport path to thereby permit documents that are not to receive endorsements to pass without interference through the endorser station defined by the path-defining walls **39**, **39'**. Such documents would accordingly remain under the control of the upstream and downstream drive **41** and the drive means **35**, **35'** shown in FIG. **3**. It will be apparent from FIG. **3** that the upstream and downstream drive means **35**, **35'** would be spaced apart a distance less than the length of the documents being processed, such that the leading edge of a document would be received by the downstream feed rollers **35**, **35'** before the trailing edge of the document is released by the upstream feed rollers **35**, **35'**. Upon receipt of a signal along the line **51'** in FIG. **4**, to thereby initiate the endorsable printing of both fixed and variable information on a document entering the endorsing station, Drive and Print Control Means represented by the block **45'** would serve to gateably transmit a drive signal along the line **251** to the drive motor **63**, such drive signal being transmitted upon receipt of a signal from an LED and photodetector **253** along a line **255**. Upon receipt of the drive signal along the line **251**, the drive motor **63** and motor shaft thereof (represented by the line **125**) would serve to

rotate the endorser head assembly **55** in a counterclockwise direction and at a controlled speed corresponding to the decelerated speed of the documents through the endorsing station. Upon the initial counterclockwise rotation of the endorser head assembly **55**, the first projection **207** of the elastomeric band **205** would either serve to block the incoming document **249** or to impinge the document against the first (topmost) roller **239** of the biased back-up support means **61**, depending upon the length of the incoming document. Immediately upon the impingement of the document between the projection **207** and the topmost roller of the back-up support means **61**, the document would be decelerated from the higher upstream transit speed to the endorsing speed, as determined by the controlled rotational speed of the drive motor **63**. Following the initiation of the motor's rotation, feedback information would be supplied the print control section of the Drive and Print Control Means **45'** along a line **257**, and print pulses selectively transmitted along the line **259** to the wire matrix printer **53**. It can be seen from FIG. **4** that as the endorser head assembly **55** is rotated one complete revolution in a counterclockwise direction by the motor **63**, the fixed information contained on the inked ink stamp **189** would be printed on the document as it is impinged against the second (lowermost) roller **241** of the biased back-up support means **61**, and the variable information printed by means of the wire matrix printer **53** as the document is supported by the inked arcuate surface **163** of the platen **61** (the platen **161** and arcuate surfaces thereof not being shown in FIG. **4**). It is to be understood in viewing FIG. **4** that the selectively activatable pins of the wire printer **53** are disposed underneath the biased back-up support means **61** and cooperate directly with the platen **161** disposed at the lowermost level of the endorser head assembly **55**. Following the printing of the fixed information by the ink stamp **189** and the variable information by the pins of the wire matrix printer **53**, the second projection **209** of the endorser head assembly **55**, in cooperation with the first roller **239** of the back-up support means **61** would serve to maintain the reduced transit speed of the document during the remainder of the endorsing cycle, and until the endorser head assembly **55** is re-established in its home position. Prior to the release of the endorsed document by the projection **209** of the endorser head assembly **55** and the first roller **239** of the back-up support means **61**, the leading edge of the endorsed document would be engaged by the downstream drive means **35, 35'** (FIG. **3**) which are rotating the keeping with the faster upstream and downstream transit speed, such that upon release of the endorsed document by the projection **209** and the first roller **239**, the endorsed document would be re-accelerated to the faster transit speed and transported to the selected pocket **15** shown in FIG. **1**.

Although for inventive endorser device for printing both fixed and variable information has been described and illustrated in considerable detail, it is to be understood that various modifications and changes therein may be made by those skilled in the art without departing from the true spirit and scope of the invention, as specifically defined in the appended claims.

What is claimed is:

1. In a base-supported printing device for use in a document processor, wherein it is required that a coating of ink be applied to one or more rotatably operable print producing elements of the device for each printing cycle, improved ink applying means comprising:

(a) an inked roller rotatably mounted within a cut-away cartridge having a central aperture such that a predetermined arcuate portion thereof is exposed,

(b) means for mounting said cartridge in contiguous relationship with said print producing elements and such that said exposed arcuate portion of said inked roller is limitably disposed in juxtaposed relationship therewith, said mounting means including a cartridge supporting plate pivotally connected along a predetermined side edge thereof to said base of said printing device, said cartridge supporting plate being provided with a cartridge mounting post adjacent the pivotal connection between said plate and said base, a pair of spaced apart cartridge limit pins disposed along the end of said cartridge supporting plate interfacing with said print producing elements, a first arcuate slot disposed adjacent the end of said cartridge supporting plate remote from said interfacing end, a cammable pin disposed adjacent a predetermined end of said first arcuate slot, a second arcuate slot disposed intermediate said first arcuate slot and said cartridge mounting post, and a mounting post fixed to said cartridge supporting plate said post extending coaxially through said central aperture of said cartridge, and

(c) means for pivotally and retainably adjusting said mounting means relative to said base such that a predetermined minimal frictional contact is established between the exposed arcuate portion of said inked roller and said print producing elements, said frictional contact being effective to deposit a coating of ink on said print producing elements during the terminal phase of their operable rotation in each printing cycle.

2. The improved ink applying means defined in claim **1** wherein said adjusting means comprises an adjustment knob rotatably mounted on a pivot shaft fixed to the base of said printing device and extending through said first arcuate slot, said adjustment knob being provided with a central aperture for receiving said pivot shaft, and provided also, on the bottom surface thereof, with a continuous spiral groove extending from a terminal end adjacent said central aperture to a terminal end in substantial proximity to the outer periphery of said knob, said spiral groove being engaged by said cammable pin of said cartridge supporting plate such that upon the full rotation of said knob in a first direction the cammable pin is moved a maximum distance toward said pivot shaft to thereby rotate said plate and said cartridge away from said print producing elements, and such that upon the rotation of said knob a variable distance in a second direction the cammable pin is moved a variable distance away from said pivot shaft to thereby establish said predetermined minimal frictional contact between said exposed arcuate portion of said inked roller and said print producing elements of said printing device.

3. The improved ink applying means defined in claim **2** wherein the adjustment of said adjusting means to establish said predetermined minimal frictional contact between said exposed arcuate portion of said inked roller and said print producing elements is retained by means of a biased detent supported by said base of said printing device and extending through said second arcuate slot formed in said cartridge supporting plate, said biased detent being retainably engaged by a selected

one of a plurality of equally spaced apart locating indentations formed in the bottom surface of said adjustment knob outwardly adjacent the outer periphery of said continuous spiral groove.

4. The improved ink applying means defined in claim 1 wherein said pair of spaced apart cartridge limit pins of said cartridge supporting plate cooperate with the outer extremities of the cutaway portion of said cartridge to thereby limit the rotation of said cartridge on said mounting post and to prevent said cartridge from coming into contact with said print producing elements of said printing device.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 4,133,262

DATED : January 9, 1979

INVENTOR(S) : Jack Beery

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Abstract, Line 23, should be --the curvilinear--.
Col. 1, Line 18, should be --"A Straight Line Read System"--.
Line 20, should be --U.S. Patent No. 4,068,212--.
Line 24, should be --U.S. Patent No. 3,972,522--.
Line 27, should be --U.S. Patent No. 4,015,701--.
Col. 2, Line 19, should be --common elements--.
Col. 4, Line 9, should be --read station--.
Line 52, after transporting and before at insert --documents--.
Col. 6, Line 11, after bearing and before 93 insert --mount--.
Col. 9, Line 32, should be --translatably supported--.
Line 39, should be -- knob 101--.
Col. 11, Line 31, after platen and before (the insert --161--.
Line 51, should be --in keeping--.

Signed and Sealed this

Ninth **Day of** *October 1979*

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

LUTRELLE F. PARKER
Acting Commissioner of Patents and Trademarks